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AUTHOR Young, Allison J.; Urdan, Timothy C.
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ABSTRACT

A primary objective of this study was to examine the relations among students' perceptions of the classroom goal orientation as ability-focused goals and their own goals, as well as the relationships between these two components and other motivational factors such as subject-specific self-efficacy and task value. An additional purpose was to determine the role of students' prior beliefs about intelligence on their goals, sense of efficacy, and values. Subjects were 194 sixth graders who completed 2 instruments, the Patterns of Adaptive Learning Survey (Midgley and Maehr, 1990) and a second survey constructed to measure items regarding perceptions of classroom goal orientation. Results suggest that, while perceptions of classroom goal stresses may not have a strong direct effect on how much students value their subject, there is a strong indirect effect through personal goals and self-efficacy of classroom goal stresses on subject valuing. Causes of the positive relationships between relative ability goals, self-efficacy, and subject valuing are not clear, but it is clear that it is important to differentiate between extrinsic and relative ability goals in future research, because these two goals relate with other motivational constructs in very different ways. Support is also found for the notion that there are domain differences in motivation. Four tables and one figure present study findings. (Contains 32 references.) (SLD)

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The Influence of Perceived Classroom Goals and Prior Beliefs on Aspects of Student Motivation

Allison J. Young & Timothy C. Urdan[1]
Combined Program in Education and Psychology
The University of Michigan

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Correspondence should be addressed to:

Allison J. Young
Room 1400C
610 E. University Ave.
Ann Arbor, MI 48109 - 1259

[1] Both authors contributed equally to this research.

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Research in achievement goal theory has focused on the role of the classroom environment in shaping the goals that students pursue (Ames & Archer, 1988; Meece, Blumenfeld, & Hoyle, 1988; Meece, 1991). Through instructional practices and procedures a teacher may emphasize either task-focused goals or ability-focused goals. For example, teachers who assign higher level cognitive tasks, allow students some choice of tasks, and group students heterogeneously create a more task-focused environment. Because the emphasis is on the nature of the work and on their individual progress, students sense that attention to tasks is of importance in these classrooms. In contrast, teachers who assign low-level classwork, allow students little choice of tasks, and make the issue of ability salient by grouping students according to ability or publicly acknowledging the results of evaluations create a more ability-focused environment. Because of the emphasis on relative ability and public evaluation, students focus on demonstrating their ability rather than on mastering the material being taught.

Each of these types of goal stresses in the classroom has implications for the quality of individual students' motivation. Students who hold "task-focused" goals are more likely to work hard, choose challenging tasks, and persist in the face of difficulty (Ames, 1987; Dweck, 1986; Maehr, 1989; Nicholls, 1984). In contrast, students with "ability-focused" goals are more likely to be concerned with outperforming others, and with grades and test scores (Ames, 1987). Students with learning-focused goals are likely to employ deeper cognitive strategies and self-regulatory strategies, such as monitoring comprehension and linking new information to prior knowledge, while students with ability-focused goals tend to use surface level strategies, such as memorization and writing down the first thing that comes to mind to finish the task quickly (Ames & Archer, 1988; Elliott & Dweck, 1988; Nicholls, Cobb, Wood, Yackel, & Patashnick, 1990; Nolen, 1988 Nolen & Haladyna, 1990).

A primary objective of this study was to examine the relations among students' perceptions of the classroom goal orientation as ability-focused and their own goals. We

chose to design a structural equation model that we believe is consistent with the assumptions of goal theory. For instance, if a teacher stresses competition and right answers, students are more likely to adopt ability focused goals for him or herself (Ames, 1987; Ames & Archer, 1988; Elliott & Dweck, 1988). These personal goals then influence how the student evaluates his or her performance, thereby affecting self-efficacy (Ames, 1990b). For example, receiving a low grade on an assignment might tell an ability-focused student that she is "no good at this" which in itself may cause a student to devalue the task or subject (Eccles, 1983). We are interested in understanding more about the relationship between the two components of ability-focused goals, self-efficacy, and subject value. What effect does an extrinsic- or relative ability-focus have on self-efficacy? On valuing? What about the indirect effects?

Recently, it has been suggested that rather than one global ability-focused construct, there are various components of an ability-focused goal orientation, and that these components may have different antecedents and effects. For example, Nicholls and his colleagues have suggested that the construct termed "ego-orientation" is made up of components such as superiority and conformity (Nicholls et al., 1990). Our own data indicate that what others have called ability-focused goals form two separate constructs - extrinsic goal orientation and relative ability goals. Therefore, the second objective of the present study is to investigate the relationships between these two components and other motivational factors such as subject specific self-efficacy and task value.

A third objective of this research is to determine the role of students' prior beliefs about intelligence on their goals, sense of efficacy, and values. Research has found that beliefs about the nature of intelligence have a significant impact on motivation, particularly on the goals people adopt (Dweck, 1986; Dweck & Leggett, 1988). For example, students who believe that intelligence or ability is modifiable are less likely to hold ability-focused goals. As previously stated, those goal orientations will in turn have an impact on a students self-efficacy and subject valuing.

Subject valuing was chosen as the outcome variable in our causal model because little empirical work has described the relationship between self-efficacy, goals, and valuing. Wigfield and Eccles (in press) have presented a recent theoretical analysis that suggests that value may influence students' adoption of goals as well as their self-efficacy. In this study we offer an alternative model that is consistent with goal theory. Goal theory suggests that goal stresses in the environment directly affect the goals students adopt (Ames, 1984). Since self-esteem and subject value are aspects of the individual that contribute to motivation, we placed them temporally following goals in our model.

Finally, there is evidence to suggest that the nature of instruction within subject areas may itself be a factor in students' motivational orientation (Stodolsky, 1988: Stodolsky, Salk, & Glaessner, 1991; Stodolsky & Grossman, 1992; Young, Arbreton, & Midgley, 1992). In one interview study, teachers of math were more likely to characterize their subject as static and clearly defined (Stodolsky & Grossman, 1992). Another study found math to employ individual seatwork as the primary instructional format, with few cooperative activities and little variety in instructional materials (Stodolsky, 1988). A subsequent study found that the instructional patterns of social studies and math influence students' thinking in those subject areas. One finding was that students tended to view math in terms of success or failure and in terms of ease or difficulty of work (Stodolsky, Salk, & Glaessner, 1991). It appears that these different contexts provide different cues for students' motivation.

This study investigates the complex nature of transmission of goals from classroom to student, as well as the relationship between prior beliefs about intelligence and ability-focused goal orientation. We also examined the effects of such goals on self-efficacy and subject matter valuing. It is important to understand the relations among these motivational constructs so that we can design appropriate interventions to enhance the motivation of early adolescents. In this study, we focus on three major research questions:

1) How do perceptions of the classroom as having ability-focused goals affect the adoption of personal ability-focused goals, self-efficacy, and subject value?

2) Do the two dimensions of ability goals - extrinsic and relative ability, have different effects on self-efficacy and subject valuing? Do perceptions of the classroom as having ability-focused goals differentially influence these two dimensions?

3) How do beliefs about the modifiability of intelligence influence the adoption of personal ability-focused goals, self-efficacy, and subject value?

4) Is the nature of these relationships different in English and mathematics?

METHOD

Subjects

Data for this study were obtained as part of a larger, on-going research project (Maehr & Midgley, 1991). A subsample of 194 sixth grade students from 8 classrooms completed questionnaires . These students attended one of two middle schools in a district which is near a large, midwestern metropolitan center. The population is predominantly white and working class.

Measures

Two separate surveys were administered to students to obtain the data for this study. The first survey (Patterns of Adaptive Learning Survey or PALS, from Midgley & Maehr, 1990) included items regarding personal goal orientation, self-efficacy, task value, and beliefs about the nature of intelligence, while the second survey included items regarding perceptions of the classroom goal orientation. Except for the items assessing beliefs about the nature of intelligence, all items were stated in a subject specific manner (English and math). Students responded to the survey items using a five-point Likert scale (for example, 1=not at all true of me to 5=very true of me). Surveys were constructed by research staff and include items from other surveys (Ames & Archer, 1988; Harter, 1981; Nolen, 1988; Nolen & Haladyna, 1990; Pintrich & DeGroot, 1990). Both surveys were

administered aloud to students in classrooms by members of the research team to control for varying levels in reading ability and students were verbally assured of the confidentiality of their responses.

Analysis

To investigate the relationships among the variables, we developed a causal model which we believe is consistent with the assumptions of goal theory. We ran two parallel analyses, one for English and the other for math because we suspect that students perceptions of the instruction in these subject areas may have implications on their motivational orientation (Stodolsky, Salk, & Glaessner, 1991; Young, Arbreton, & Midgley, 1992).

The models were tested using the LISREL VI program (Joreskog & Sorbom, 1984). Figure one presents the model with standardized gamma, beta, and phi coefficients for English and math respectively. Standardized coefficients were used to facilitate interpretation. Structural equation modeling allows us to make inferences about causality while taking into account measurement error, an important variable that can lead to biased estimates of the relationship between constructs (Andrews, 1984). Two separate models were run, one for English and one for math. In addition, we have included the R-squared values (rather than the psi coefficients) for English and math next to each latent variable to clarify our results.

Because we had relatively few cases in our sample (N=194) and a fairly complex model, it was necessary to reduce the number of free parameters to insure that our results would be reasonably accurate. Using a technique described and defended by Liang, Lawrence, Bennett, and Whitelaw (1990), we reduced the number of free parameters by using composites, or scales, rather than individual measured variables to indicate our latent variables. According to this technique, the variables indicating a given latent variable (e.g. self efficacy) are placed together in a scale, a reliability coefficient is determined, and the scale is used as a single indicator of the factor. We computed Cronbach's alphas (a method well suited to our 5-point Likert scale data) for each set of variables separately by construct.

Scales and items for all constructs are provided in Table 1. All alphas were over .60. Table 2 provides means and standard deviations for the constructs in each subject area. Then we set the lambdas (the path between the measured variable and the latent factor) at the square root of the alpha for each latent factor in the model, according to the method described by Liang et. al. (1990). Finally, the error variance for each scale indicating a latent factor was fixed at 1-α for each scale. Tables 3 and 4 display the within subject area bivariate statistics.

RESULTS

Fit

Usually fit statistics are an important measure of how well the structural model fit the observed data. Because we fixed so many parameters, however, our measures of fit are somewhat uninformative. For example, the Goodness of Fit Indices (GFIs) are .98 and .99 for the English and math models, respectively. Because there is only one degree of freedom in each model, however, Hoetler's Critical Number (CN) is 71.2 and 78 for English and math respectively, well below the desired cut-off of 200. Overall, the fit is reasonable for each model.

Relationships Among Factors

One way to think of a LISREL model is as a hierarchical regression model. In the case of our models, the two exogenous latent variables (ksi 1 and ksi 2) can be thought of as predictors of the endogenous latent variables (eta 1 through eta 4). In addition, eta 1 and eta 2 predict eta 3 and eta 4. Finally, eta 3 predicts eta 4 as well. Stated simply, the factors on the left side of the model predict variation in the factors to the right. The numbers over the lines linking the factors can be thought of loosely as beta coefficients used in

standardized regressions. They indicate the strength of the relationship between each factor, controlling for the other relationships in the model.

The first result of note is that, for the most part, a substantial amount of variance in each eta is explained in these models. For example, nearly 50% of the variance in subject specific self-efficacy is explained by the model (R^2_{psi3}=.48 and .46 for English and math, respectively). For subject value, the amount of explained variance is even greater (R^2_{psi4}=.57 and .86 for English and math, respectively). Of particular note is that this model explains 86% of the variance in valuing of math among the sixth grade students in our sample. For extrinsic and relative-ability goal orientations, the amount of variance explained is considerably less, yet still substantial.

Relations Among Constructs

To determine how the factors in the model relate with each other, the gammas (links between the ksis and the etas) and the betas (links between the etas) need to be interpreted. The gammas indicate that students' goals were not directly influenced by their beliefs about intelligence, but were significantly influenced by their perceptions of the degree to which ability-focused goals are stressed in their English and math classrooms. While beliefs about intelligence did not shape students' goals, there is a significant link between these beliefs and students feelings of efficacy in English (gamma=.51, $p<.001$) and math (gamma=.32, $p<.01$). Perceptions of the classroom stress on ability-focused goals, in contrast, did not directly affect students' feelings of efficacy in English and math. Finally, both beliefs about intelligence and perceptions of classroom goals had only weak direct effects on students' valuing of English and math.

An examination of the beta coefficients (links between the etas) reveals that there are significant relationships between virtually all of the endogenous latent variables (etas). Extrinsic focused goal orientation (eta 1) has a particularly strong negative effect on self efficacy ($beta_{31}$=-.37, $p<.001$ and -.57, $p<.001$ for English and math, respectively) and

subject value (-.38 and -.58 respectively, $p<.001$). A relative-ability goal orientation (eta 2) has a significant, positive effect on self-efficacy in both English and math (beta=.23 and .27, respectively, $p<.05$), but only has a significant effect on subject value in English (beta=.23, $p<.01$). For both English and math, self-efficacy is significantly, positively related to valuing of the subject (beta=.31 and .36 respectively, $p<.05$).

Domain Differences

The general pattern of results for the English and math models were very similar. The primary difference of note is that most relationships between constructs were stronger in math than in English. For example, the relationship between perceptions of the classroom as ability focused (ksi 1) and extrinsic goals, relative ability goals, and self-efficacy were all stronger in math than in English. While the direct effects of perceptions of the classroom as ability focused (ksi 1) on subject value (eta 4) were stronger in English than in math (gamma=-.21 and -.11 respectively), the *total* effect of ksi 1 on eta 4 (direct plus indirect effects through other constructs) was higher for math (-.34) than for English (-.24). It is because of these stronger relationships among the constructs in math that more of the variance in subject valuing, our outcome variable, was explained in math than in English.

The amount of variance explained in the students' personal goals is also higher in math than in English. Twenty-nine percent of the variance in students' pursuit of extrinsic goals in math is explained in this model, compared to only nine percent in English. A similar, though less dramatic difference is found in the relative ability goal orientation factor ($R^2_{eta\ 2}$=.16 for math, .06 for English). Because the relationships between beliefs about intelligence (ksi 2) and the two goal constructs (eta 1 and eta 2) are not significant, the larger amount of variance explained in eta 1 and eta 2 for math indicates that students' perceptions of the goals stressed in their classrooms may play more of a role in shaping their own extrinsic and relative ability goals in math than in English.

One interesting area where this pattern of stronger relationships in math does not hold true is in the relationship between relative ability goal orientation and valuing of the subject. In math, this relationship is nonsignificant ($beta_{42}$=.05). In English, however, having an ability-focused goal orientation is significantly, positively affecting valuing of English ($beta_{42}$=.23, $p<.01$).

DISCUSSION

This research was designed to address two main issues. First, we wanted to examine how some of the most prominent social-cognitive motivational constructs relate to each other and make some causal inferences about these relationships. Second, we wanted to examine whether there were domain differences in these relationships. The discussion of our results will focus on each of these issues separately.

Relations Among Constructs: Is this Causality?

The results of our structural equation modelling raise interesting questions for researchers interested in motivation. While most of the results are in the predictable direction, there are some important highlights that need elaboration. First, as was mentioned in the results section, the relationship between classroom perceptions of goal stresses and motivational constructs is of note. In particular, it is important to realize that while perceptions of classroom goal stresses may not have a strong direct effect on how much students value their subject, there is a strong indirect effect via personal goals and self-efficacy of classroom goal stresses on subject valuing. While we are not aware of previous work that has examined the relationship between goals stressed in the classroom and students' valuing of English and math, our results do support the findings of others (Ames & Archer, 1988; Meece, 1991) who found a link between students personal goals and their perceptions of classroom goal stresses. Similarly, the finding that students who believe in

the modifiability of intelligence are more likely to feel efficacious supports the previous findings of others (Dweck, 1986; Dweck & Leggett, 1988; Schunk, 1989a).

Our model presents one plausable picture of how these constructs relate to each other. It is a model that fits the assumptions of causality, both temporally and theoretically. But this does not make it reality. The real nature of the relationships between these constructs is probably recursive, with each construct shaping each other construct as the student progresses through year after year of schooling. Taken as a group, these constructs represent the "baggage" (Maehr, 1984) that each student brings with them to a new learning environment. It remains unclear whether valuing of the subject shapes the goals students pursue, as Wigfield and Eccles suggest (in press), or whether goals shape feelings of efficacy and valuing, as others suggest (Ames & Ames, 1984). We do not wish to suggest that this model is the answer, rather an answer.

Whether these factors shape each other in the manner we have proposed may not be the most important question raised by this research. What may be more important are the implications for classroom instruction raised by these results. It appears clear that when students perceive their classroom to be emphasizing extrinsic goals, they are more likely to pursue extrinsic goals themselves, such as doing their work for the sake of earning a high grade. Pursing extrinsic goals is negatively related to feelings of efficacy and valuing of the subject. Other research has found that pursuing ability-focused goals in general are related to the use of surface cognitive strategies (Nolen, 1988; Nolen & Haladyna, 1990). Because of the negative effects of extrinsic goals, it may be advisable to downplay these types of goals in the classroom.

The implications for the results regarding relative ability goals may be less clear. According to our results, perceptions that ability-focused goals are stressed in the classroom causes students to adopt relative ability goals. This relationship is as we predicted. What we did not expect to find is that pursuing relative ability goals causes

students to feel more efficacious. Even more surprising is the finding that, in English, students who pursue relative ability goals value the subject more. Why might this be?

One way to interpret this finding is through the perspective of goal theory. Ames (1984) has demonstrated that when pursuing relative ability goals, high achieving students may feel more efficacious, since they will compare favorably with other students. We believe that for these students, doing better than others should then lead to greater valuing of the subject, which is the case in English. But what about the low-achieving students? For these students, pursuing relative ability goals should lead to lower feelings of efficacy and task value, since comparisons with others would lead to unfavorable conclusions about one's own ability. We have no evidence from our data that high and low achieving students differ in their pursuit of relative ability goals, so we are unable to attribute our findings to differences between high and low achievers.

Another interpretation of this finding uses a self-efficacy theory perspective. One of the methods of acquiring self-efficacy information is by observing the performances of "similar others," peers with whom a student identifies (Schunk, 1989a, 1989b). If a similar peer is capable of accomplishing a task, chances are a student will be likely to believe that he or she is capable of accomplishing the same task. However, this interpretation does not address the issue of the relationship between perceptions of the classroom as ability-focused and relative ability goals, a crucial link in this picture.

The cause of the positive relationships between relative ability goals, self efficacy, and subject valuing remain a mystery to us. What is clear from our results, however, is that it is important to differentiate between extrinsic and relative ability goals in future research. Because these two goals relate with other motivation constructs in very different ways, it appears unwise to place these goals in the same construct, such as a more global "performance" or "ego" construct (Nicholls, et al., 1990).

Domain Comparisons

As was mentioned briefly in the results section, the primary difference between the results for the English and math models is that the relationships between the constructs are generally stronger in the math model. Substantially more variance is being explained in students goals and valuing for math than for English. The results suggest, in particular, that classroom goal stresses play a particularly strong role in shaping students goals, efficacy, and valuing in math.

The stronger effect of perceived classroom goal stresses on students extrinsic and relative ability goals in math may be due in part to the greater ambiguity of instructional goals in English compared to math. In general, there tends to be more consensus on issues of curricular sequence and boundaries in math than in English (Stodolsky & Grossman, 1992). Math teachers may be providing more consistent messages across the curriculum than their counterparts teaching English. These messages are most likely focusing on getting right answers and absolute levels of achievement in math, which are extrinsic goals. In English, however, teachers are more likely to consider class participation and improvement which are not considered ability-focused goals.

A similar phenomenon may explain the stronger relationship in math than in English between classroom goal stresses and relative ability goals. Because teachers tend to make use of an absolute rating criterion in the typical math classroom than the typical English classroom, it is easier for students to make determinations about how they compare with other students in math than in English. This may explain why ability goal stresses are linked more strongly to relative ability goals among students in math compared to English. The same logic extends to the stronger relationship in English than in math between beliefs about the modifiability of intelligence and self efficacy. Since success in math is unambiguous, it may be easier for students to believe that some students simply "have what it takes" to succeed in math, while others do not (Stodolosky, Salk, & Glaessner, 1991). English, in contrast, has less ambiguous paths to success, which may cause students to

believe that success can be reached through effort and hard work in English, moreso than in math.

One domain difference that is more difficult to understand is why the relationship between relative ability goals and subject valuing is stronger in English than in math. According to our results, pursuing relative ability goals leads to greater valuing of the subject in English, while there is no relationship between these constructs in math. One explanation may be statistical: The relationship between extrinsic goals and subject valuing is so strong in math, there is little explanatory power left for relative ability goals. But this explanation is unsatisfying. At this point, we are unclear about why students value English more when they are pursuing relative ability goals. A closer examination of what is happening in these English classrooms may be necessary to understand this relationship.

Because our results differed considerably for math and English, they suggest that researchers interested in motivation should perhaps avoid more general, school level examinations of these constructs. Apparently, students perceive differences in the types of goals stressed in their classrooms, and the effect of these goals stresses on students personal goals, feelings of efficacy, and valuing of the subject differ by domain as well.

CONCLUSION

This study sheds light on several issues in motivational research. First, it appears that students' perceptions of the goal stresses in their classroom have a strong effect on their own goals. In turn, students' goals seem to have a substantial and significant effect on other motivational constructs such as self-efficacy and subject valuing. Finally, we found support for the notion that there are domain differences in motivation. In most cases, the math model showed stronger effects than the English model, with respect to goal stresses. Also, more of the variance in subject value is explained by the math model. In contrast, the English model showed a strong relationship between beliefs about the modifiability of

intelligence and self-efficacy. These results provide further support for the notion of "contextualized motivation."

Future research in this area might continue to include measures that are more content specific, to account for domain differences Also, further research should attempt to include more information about the actual classroom practices which might be perceived as ability-focused. Many of the works cited in this study employed classroom observations as part of the analyses (Meece, Blumenfeld, & Hoyle, 1988; Meece, 1991; Stodolsky, 1988). By documenting the actual classroom practices, we may be able to better determine the kind of influence these practices have on student motivation (Blumenfeld, 1992).

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Table 1
Scale Items and Reliabilities

Classroom Ability Focus — Alpha=.86 (English), .78 (Math)

1) Our math (English) teacher makes it obvious which students are not doing well in math (English).
2) When we work in small groups in math (English) class, smart kids always work with other smart kids.
3) Our math (English) teacher gets upset when we make mistakes on our classwork.
4) Our math (English) teacher gets upset when we make mistakes on tests.
5) Our math (English) teacher talks a lot about grades.
6) Only a few students do really well in math (English) class.
7) Our math (English) teacher calls on smart students more than other students.
8) In our math (English) class, it's more important to get the right answers than to know why they're right.
9) Our math (English) teacher goes on to new topics in math (English) even if we don't understand what we are learning now.

Modifiability of Intelligence — Alpha=.78 (General)

1) Almost any student can get to be very intelligent.
2) Students who don't seem intelligent now can get to be very intelligent if they work hard.
3) Intelligence is something students can increase as much as they want.
4) All students can get to be very intelligent if they try.

Student Goal Orientation--Extrinsic — Alpha=.68 (English), .60 (Math)

1) I don't care whether I understand something or not in math (English), as long as I get the right answer.
2) I like math (English) work that is easy.
3) The main reason I do my work in math (English) is because we get grades.

Student Goal Orientation--Relative Ability — Alpha=.84 (English), .79 (Math)

1) I would feel successful in math (English) if I did better than other students.
2) I would feel really good if I were the only one who could answer the teacher's questions in math (English).
3) I'd like to show my math (English) teacher that I'm smarter than other kids in the class.

Self Efficacy — Alpha=.64 (English), .64 (Math)

1) Even if the work in math (English) is hard, I can learn it.
2) If I have enough time, I can do even the hardest problems in math (English).

Value of the Subject — Alpha=.77 (English), .64 (Math)

1) In general, how useful is what you learn in math (English)?
2) How interesting is math (English) to you?
3) How important is it to you to be good in math (English)?

Table 2
Descriptive Statistics for Constructs

	English		Math	
	Mean	S.D.	Mean	S.D.
Classroom Ability Focus	2.65	.99	2.06	.73
Modifiable Intelligence	3.99	.88	3.99	.88
Student Goals--Extrinsic	2.80	1.11	2.71	1.02
Student Goals--Relative Ability	2.73	1.19	2.94	1.12
Self-Efficacy	3.57	1.10	3.86	1.02
Subject Value	3.41	1.06	4.07	.84

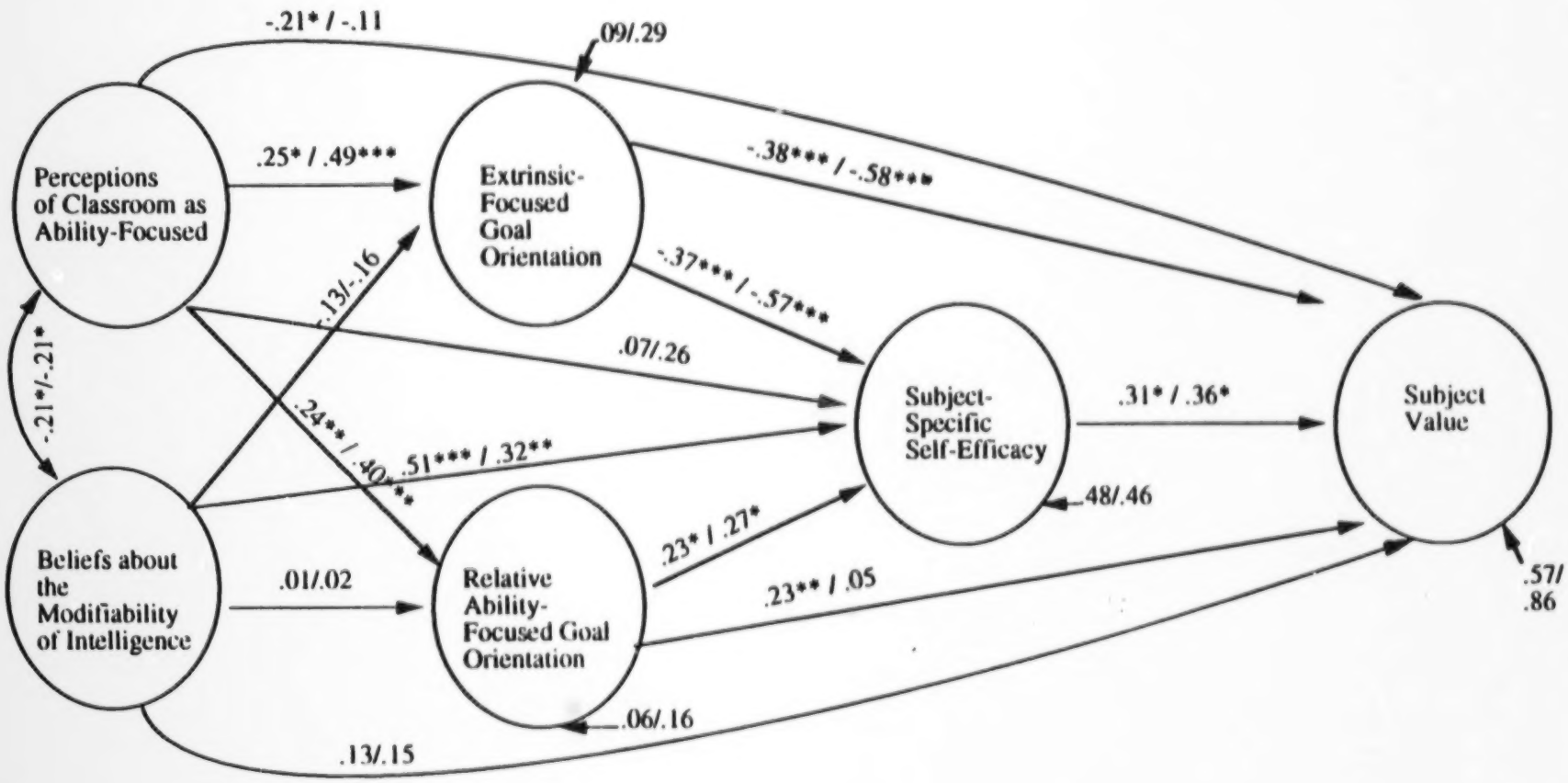
Table 3
Zero-order correlations for English

	1	2	3	4	5
1) Class Ability Focus	1.00				
2) Modifiable Intelligence	-.16	1.00			
3) Goals--Extrinsic	.19	-.13	1.00		
4) GoalsRel. Ability	.19	-.02	.25	1.00	
5) Self Efficacy	-.06	.40	-.25	.10	1.00
6) Subject Value	-.25	.32	-.37	.10	.42

Table 4
Zero-Order Correlations for Math

	1	2	3	4	5
Class Ability Focus	1.00				
Modifiable Intelligence	-.14	1.00			
Student Goals--Extrinsic	.32	-.17	1.00		
Student Goals--Rel. Ability	.28	-.04	.25	1.00	
Self Efficacy	.01	.29	-.27	.13	1.00
Subject Value	-.28	.33	-.50	-.07	.45

Figure 1.
Standardized solutions for English and math models.
(N=194)



*p<.05, **p<.01, ***p<.001
see Results for fit statistics

Note:
Three types of parameter estimates are pictured. The curved line with arrows at both ends is the covariance between the exogenous factors. Lines with arrows at one end depict causal effects of one latent factor on another as well as the assumed direction of these relationships. Finally, very short arrows represent the variance explained in each latent variable by the exogenous factors (R-squared values). Values to the left of the slash are for English and values to the right of the slash are for math. The same students responded in both subject areas.